Colloid Journal of the Russian Academy of Sciences: Kolloidnyi Zhurnal 2000 vol.62 N1, pages 68-73

Specific features of the pretransition state of n-(--ethoxybenzilidene)-p' -n-butylaniline nematic studied by the self-diffusion of molecules in isotropic phase

Kashirin N., Skirda V., Ovchinnikov I.
Kazan Federal University, 420008, Kremlevskaya 18, Kazan, Russia

Abstract

Experimental data on the self-diffusion of the molecules of n-(p-ethoxybenzilidene)--'-n-butylaniline (EBBA) isotropic nematic in the bulk and porous media are reported. It is disclosed that, as the temperature decreases, the temperature dependence of the ratio of the self-diffusion coefficient of EBBA in a porous medium Deff to that of EBBA in the bulk Ds is transformed from the Deff/Ds = const regime to the Deff/DS =f(T) mode at 361 and 355 K for porous media with pore diameters 40 and 400 Å, respectively. It was also found that in the bulk EBBA, temperature dependence of the self-diffusion coefficient near the temperature of isotropicnematic transition deviates from the Arrhenius pattern and diffusion decay becomes nonexponential. These facts are related to the presence of nematically ordered cybotactic groups in the EBBA isotropic phase and to their effect on the mean self-diffusion coefficient of EBBA molecules at temperatures much higher than that of isotropic-nematic transition. It is noted that the presence of cybotaclic groups affects diffusion in the porous medium much more strongly than that in the bulk EBBA.